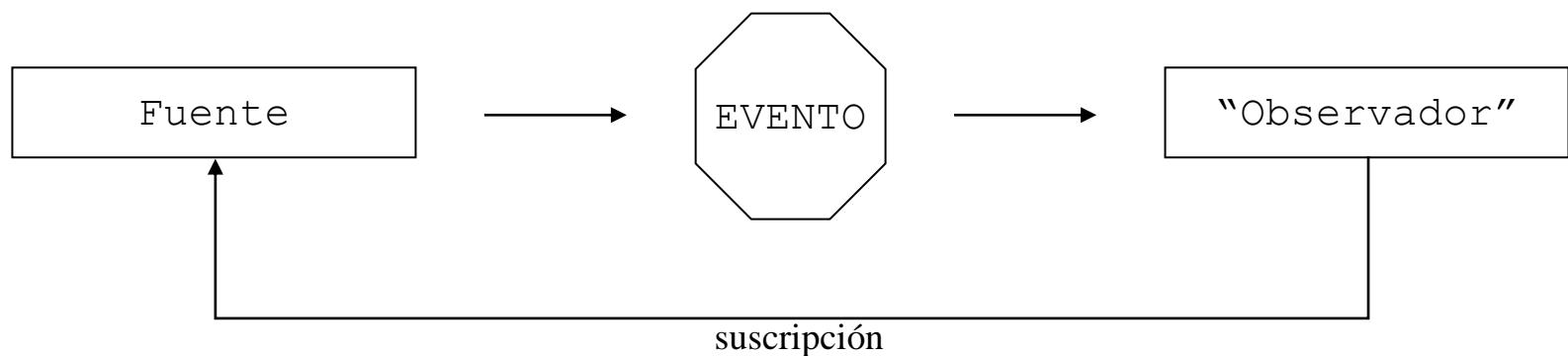
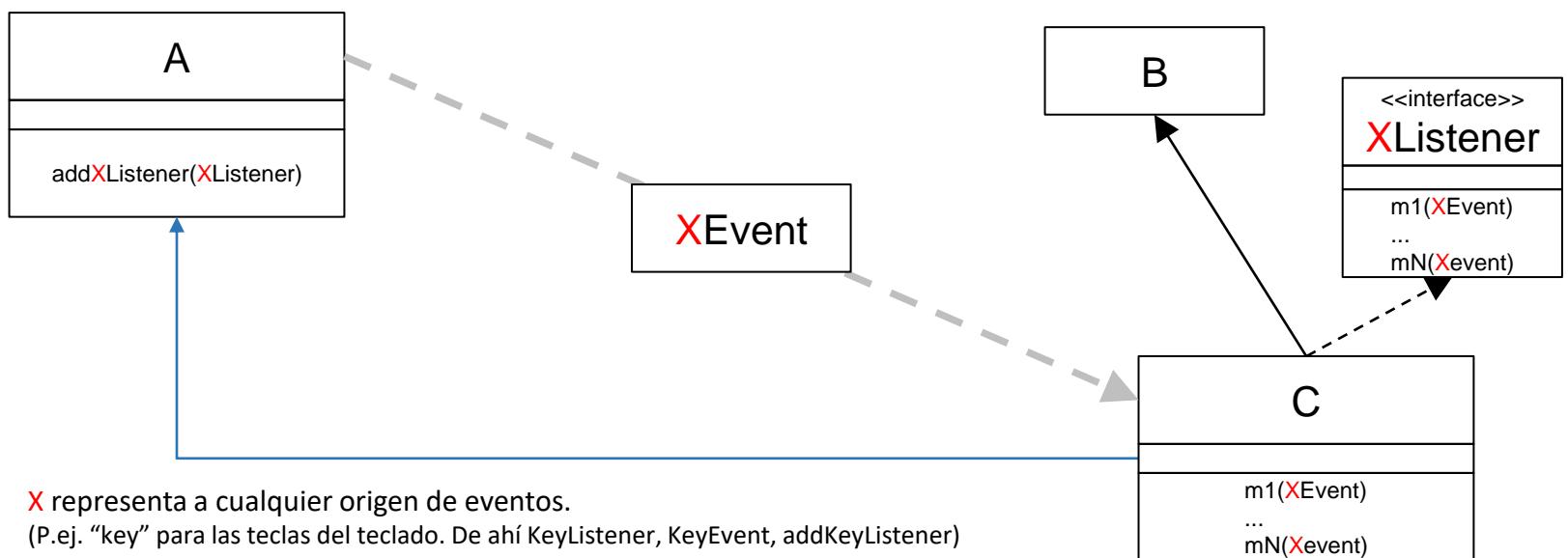
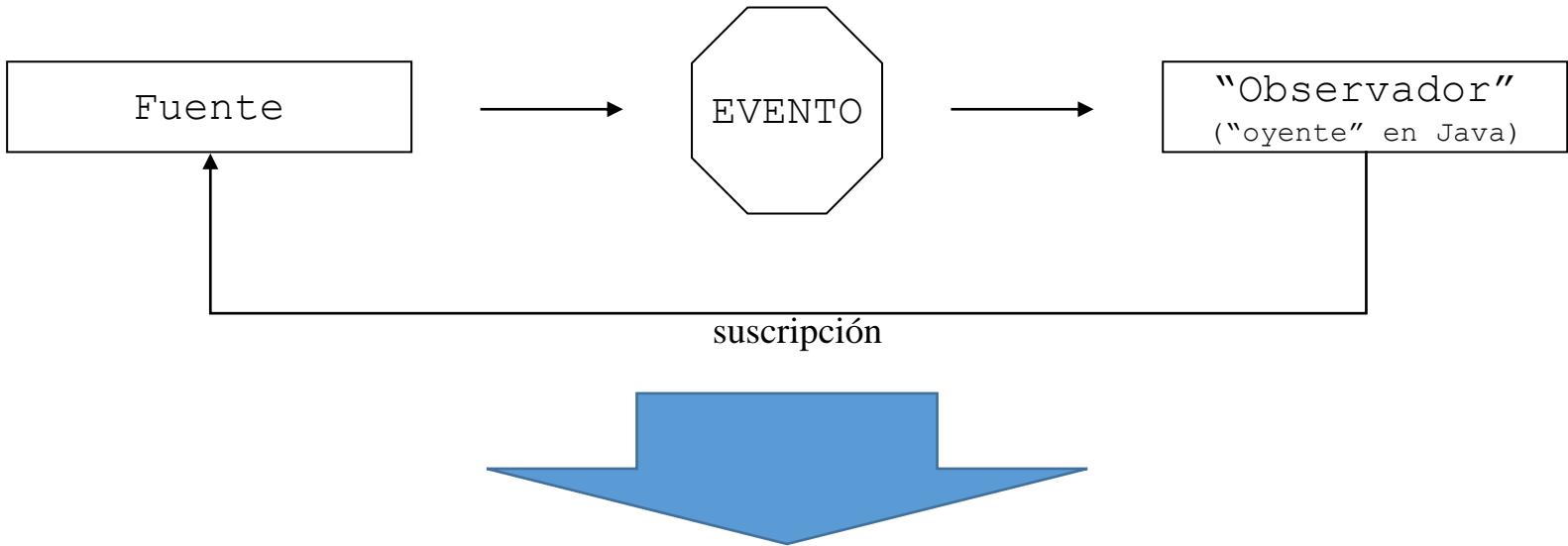


Interacción con GUIs

Un uso concreto del patrón “Delegation Event Model”

Más conocido como “[Observer](#)” o “Publish/subscribe”





Module java.desktop ← Aunque nos limitemos a Java7, podemos “familiarizarnos” versiones posteriores a Java9

Package java.awt.event

Interface KeyListener

All Superinterfaces:

EventListener

All Known Implementing Classes:

AWTEventMulticaster, BasicComboBoxUI.KeyHandler, BasicComboPopup.InvocationKeyHandler, BasicTableUI.KeyHandler, BasicTreeUI.KeyHandler, KeyAdapter

```
public interface KeyListener  
extends EventListener
```

The listener interface for receiving keyboard events (keystrokes). The class that is interested in processing a keyboard event either implements this interface (and all the methods it contains) or extends the abstract KeyAdapter class (overriding only the methods of interest).

The listener object created from that class is then registered with a component using the component's addKeyListener method. A keyboard event is generated when a key is pressed, released, or typed. The relevant method in the listener object is then invoked, and the KeyEvent is passed to it.

Since:

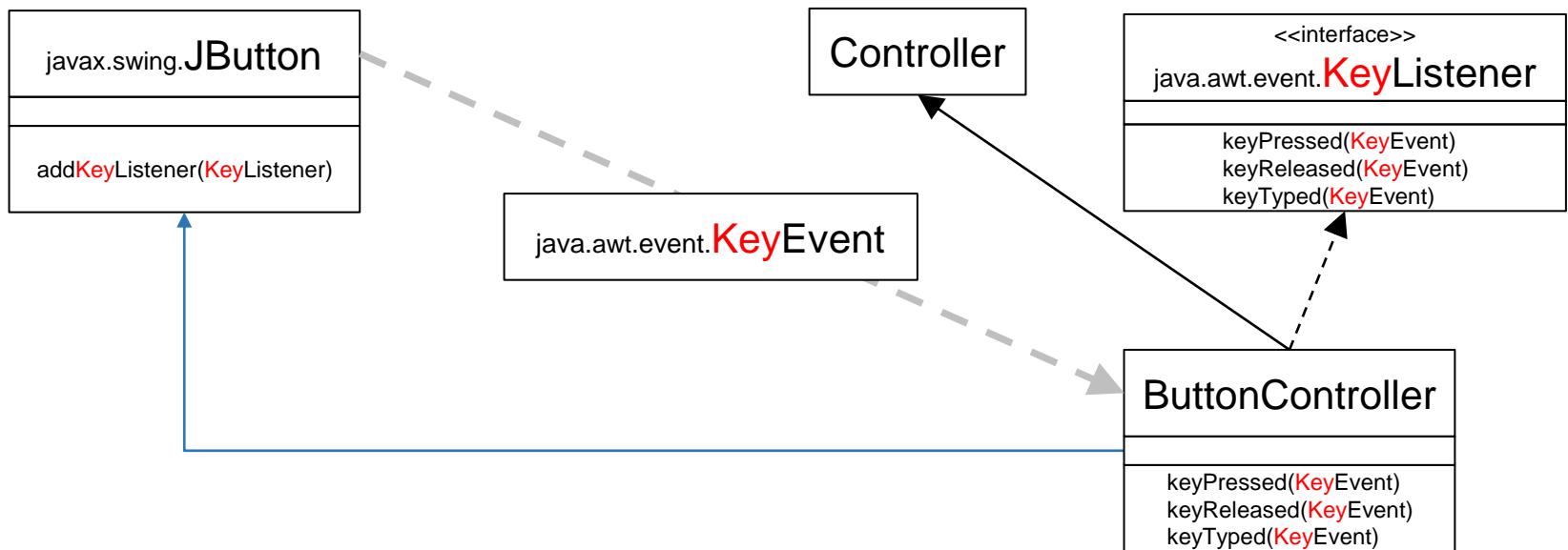
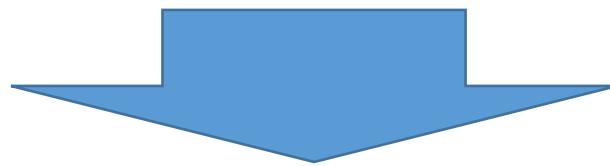
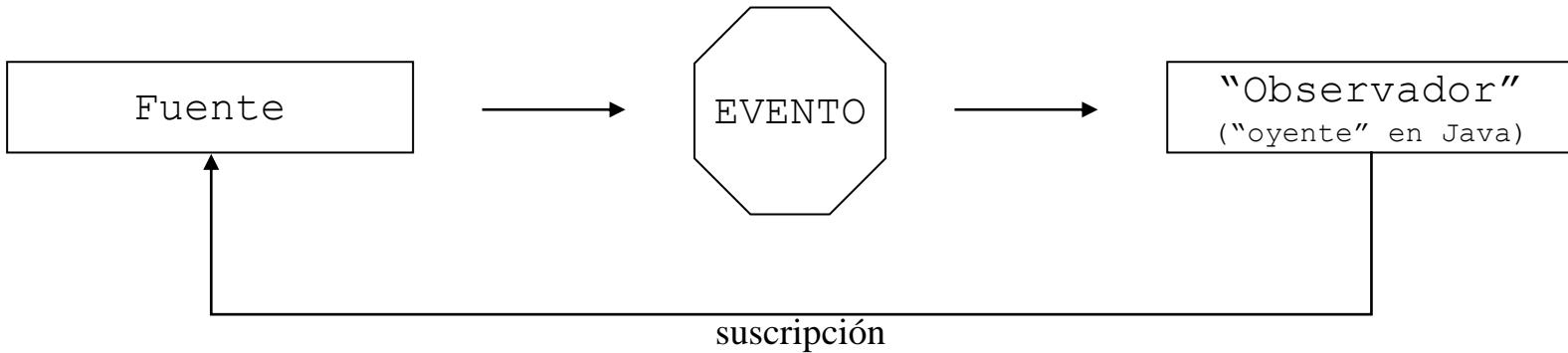
1.1

See Also:

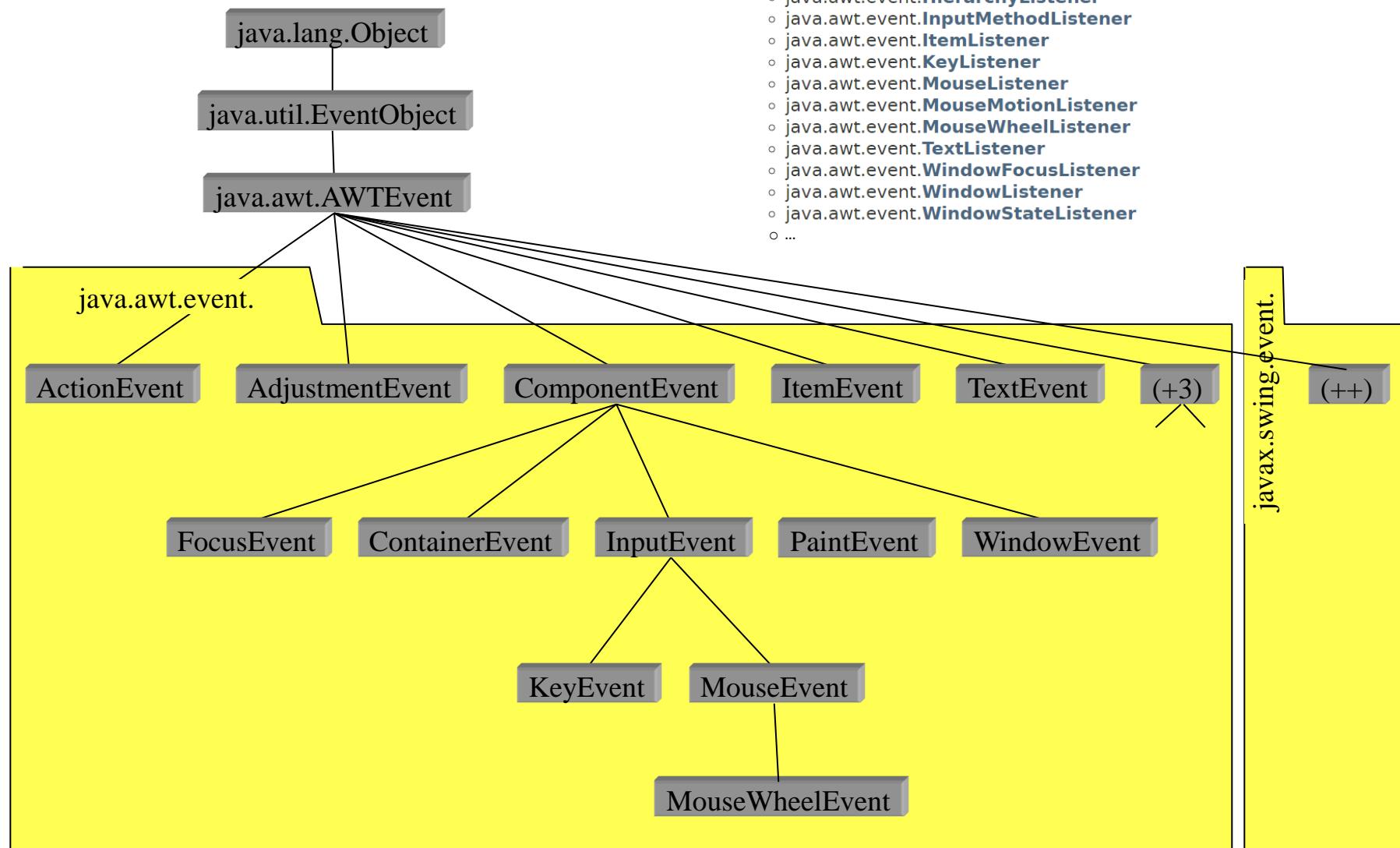
[KeyAdapter](#), [KeyEvent](#), [Tutorial: Writing a Key Listener](#)

Method Summary

All Methods	Instance Methods	Abstract Methods	
Modifier and Type	Method	Description	
void	keyPressed(KeyEvent e)	Invoked when a key has been pressed.	
void	keyReleased(KeyEvent e)	Invoked when a key has been released.	
void	keyTyped(KeyEvent e)	Invoked when a key has been typed.	



“Listeners” y eventos disponibles en un GUI con awt/swing



Module java.base
Package java.util

El patrón Observer es muy utilizado

Interface EventListener

All Known Subinterfaces:

Action, ActionListener, AdjustmentListener, AncestorListener, AppForegroundListener, AppHiddenListener, AppReopenedListener, AWTEventListener, BeanContextMembershipListener, BeanContextServiceRevokedListener, BeanContextServices, BeanContextServicesListener, CaretListener, CellEditorListener, ChangeListener, ComponentListener, ConnectionEventListener, ContainerListener, ControllerEventObserver, DocumentListener, DragGestureListener, DragSourceListener, DragSourceMotionListener, DropTargetListener, FlavorListener, FocusListener, GUIInitializedListener, HandshakeCompletedListener, HierarchyBoundsListener, HierarchyListener, HyperlinkListener, IIOReadProgressListener, IIOReadUpdateListener, IIOReadWarningListener, IIOWriteProgressListener, IIOWriteWarningListener, InputMethodListener, InternalFrameListener, ItemListener, KeyListener, LineListener, ListDataListener, ListSelectionListener, MenuDragMouseListener, MenuKeyListener, MenuItemListener, MetaEventListener, MouseInputListener, MouseListener, MouseMotionListener, MouseWheelListener, NamespaceChangeListener, NamingListener, NodeChangeListener, NotificationListener, ObjectChangeListener, PopupMenuListener, PreferenceChangeListener, PropertyChangeListener, RowSetListener, RowSorterListener, ScreenSleepListener, SSLSessionBindingListener, StatementEventListener, SystemEventListener, SystemSleepListener, TableColumnModelListener, TableModelListener, TextListener, TopLevelWindowListener, TreeExpansionListener, TreeModelListener, TreeSelectionListener, TreeWillExpandListener, UndoableEditListener, UnsolicitedNotificationListener, UserSessionListener, VetoableChangeListener, WindowFocusListener, WindowListener, WindowStateListener

All Known Implementing Classes:

AbstractAction, AbstractButton.ButtonChangeListener, AWTEventListenerProxy, AWTEventMulticaster, BasicButtonListener, BasicColorChooserUI.PropertyHandler, BasicComboBoxEditor, BasicComboBoxEditor.UIResource, BasicComboBoxUI.FocusHandler, BasicComboBoxUI.ItemHandler, BasicComboBoxUI.KeyHandler, BasicComboBoxUI.ListDataHandler, BasicComboBoxUI.PropertyChangeHandler, BasicComboPopup.InvocationKeyHandler, BasicComboPopup.InvocationMouseHandler, BasicComboPopup.InvocationMouseMotionHandler, BasicComboPopup.ItemHandler, BasicComboPopup.ListDataHandler, BasicComboPopup.ListMouseHandler, BasicComboPopup.ListMouseMotionHandler, BasicComboPopup.ListSelectionHandler, BasicComboPopup.PropertyChangeHandler, BasicDesktopIconUI.MouseInputHandler, BasicDesktopPaneUI.CloseAction, BasicDesktopPaneUI.MaximizeAction, BasicDesktopPaneUI.MinimizeAction, BasicDesktopPaneUI.NavigateAction, BasicDesktopPaneUI.OpenAction, BasicDirectoryModel, BasicFileChooserUI.ApproveSelectionAction, BasicFileChooserUI.CancelSelectionAction, BasicFileChooserUI.ChangeToParentDirectoryAction, BasicFileChooserUI.DoubleClickListener, BasicFileChooserUI.GoHomeAction, BasicFileChooserUI.NewFolderAction, BasicFileChooserUI.SelectionListener, BasicFileChooserUI.UpdateAction, BasicInternalFrameTitlePane.CloseAction, BasicInternalFrameTitlePane.IconifyAction, BasicInternalFrameTitlePane.MaximizeAction, BasicInternalFrameTitlePane.MoveAction, BasicInternalFrameTitlePane.PropertyChangeHandler, BasicInternalFrameTitlePane.RestoreAction, BasicInternalFrameTitlePane.SizeAction, BasicInternalFrameUI.BasicInternalFrameListener, BasicInternalFrameUI.BorderListener, BasicInternalFrameUI.ComponentHandler, BasicInternalFrameUI.GlassPaneDispatcher, BasicInternalFrameUI.InternalFramePropertyChangeListener, BasicLabelUI.BasicListUI.FocusHandler, BasicListUI.ListDataHandler, BasicListUI.ListSelectionHandler, BasicListUI.MouseInputHandler, BasicListUI.PropertyChangeHandler, BasicMenuItemUI.MouseInputHandler, BasicMenuItemUI.PropertyChangeHandler, BasicMenuBarUI.MouseInputHandler, BasicOptionPaneUI.ButtonActionListener, BasicOptionPaneUI.PropertyChangeHandler, BasicProgressBarUI.ChangeHandler, BasicRootPaneUI, BasicScrollBarUI.ArrowButtonListener, BasicScrollBarUI.ModelListener, BasicScrollBarUI.PropertyChangeHandler, BasicScrollBarUI.ScrollListener, BasicScrollBarUI.TrackListener, BasicScrollPaneUI.HSBChangeListener, BasicScrollPaneUI.MouseWheelHandler, BasicScrollPaneUI.PropertyChangeHandler, BasicScrollPaneUI.ViewportChangeHandler, BasicScrollPaneUI.VSBChangeListener, BasicSliderUI.ActionScroller, BasicSliderUI.ChangeHandler, BasicSliderUI.ComponentHandler, BasicSliderUI.FocusHandler, BasicSliderUI.PropertyChangeHandler, BasicSliderUI.ScrollListener, BasicSliderUI.TrackListener, BasicSplitPaneUI.SplitDivider, BasicSplitPaneUI.SplitDivider.MouseHandler, BasicSplitPaneUI.FocusHandler, BasicSplitPaneUI.FocusDownRightHandler, BasicSplitPaneUI.KeyboardEndHandler, BasicSplitPaneUI.KeyboardHomeHandler, BasicSplitPaneUI.KeyboardResizeToggleHandler, BasicSplitPaneUI.KeyboardUpLeftHandler, BasicSplitPaneUI.PropertyHandler, BasicTabbedPaneUI.FocusHandler, BasicTabbedPaneUI.MouseHandler, BasicTabbedPaneUI.PropertyChangeHandler, BasicTabbedPaneUI.TabSelectionHandler, BasicTableHeaderUI.MouseInputHandler, BasicTableUI.FocusHandler, BasicTableUI.KeyHandler, BasicTableUI.MouseInputHandler, BasicTextUI.BasicCaret, BasicToolBarUI.DockingListener, BasicToolBarUI.FrameListener, BasicToolBarUI.PropertyListener, BasicToolBarUI.ToolBarContListener, BasicToolBarUI.ToolBarFocusListener, BasicTreeUI.CellEditorHandler, BasicTreeUI.ComponentHandler, BasicTreeUI.FocusHandler, BasicTreeUI.KeyHandler, BasicTreeUI.MouseHandler, BasicTreeUI.MouseInputHandler, BasicTreeUI.PropertyChangeHandler, BasicTreeUI.SelectionModelPropertyChangeHandler, BasicTreeUI.TreeCancelEditingAction, BasicTreeUI.TreeExpansionHandler, BasicTreeUI.TreeHomeAction, BasicTreeUI.TreeIncrementAction, BasicTreeUI.TreeModelHandler, BasicTreeUI.TreePageAction, BasicTreeUI.TreeSelectionHandler, BasicTreeUI.TreeToggleAction, BasicTreeUI.TreeTraverseAction, BeanContextChildSupport, BeanContextServicesSupport, BeanContextServicesSupport.BCSSProxyServiceProvider, BeanContextSupport.Checkbox.AccessibleAWTCheckbox, Component.AccessibleAWTComponent.AccessibleAWTComponentHandler, Component.AccessibleAWTComponent.AccessibleAWTFocusHandler, ComponentAdapter.Container.AccessibleAWTContainer.AccessibleContainerHandler, ContainerAdapter.DefaultCaret, DefaultCellEditor.EditorDelegate, DefaultEditorKit.BeepAction, DefaultEditorKit.CopyAction, DefaultEditorKit.CutAction, DefaultEditorKit.DefaultKeyTypedAction, DefaultEditorKit.InsertBreakAction, DefaultEditorKit.InsertContentAction, DefaultEditorKit.InsertTabAction, DefaultEditorKit.PasteAction, DefaultTableColumnModel.DefaultTreeCellEditor, DragSourceAdapter, DragSourceContext, DropTarget, DropTarget.DropTargetAutoScroller, DropTargetAdapter, EventListenerProxy, EventQueueMonitor, FocusAdapter, FormView, FormView.MouseEventListener, HierarchyBoundsAdapter, HTMLEditorKit.HTMLTextAction, HTMLEditorKit.InsertHTMLTextAction, HTMLEditorKit.LinkController, InternalFrameAdapter, JCheckBox.AccessibleCheckBox, JCheckBoxMenuItem.AccessibleJCheckBoxMenuItem, JComboBox.JComponent.AccessibleJComponent.AccessibleContainerHandler, JComponent.AccessibleJComponent.AccessibleFocusHandler, JEditorPane.AccessibleJEditorPane, JEditorPane.AccessibleJEditorPaneHTML, JEditorPane.JEditorPaneAccessibleHypertextSupport, JLayer, JList.AccessibleJList, JMenu.AccessibleJMenu, JMenu.WinListener, JMenuItem.AccessibleJMenuItem, JPasswordField.AccessibleJPasswordField, JPopupMenu.AccessibleJPopupMenu, JRadioButton.AccessibleJRadioButton, JRadioButtonMenuItem.AccessibleJRadioButtonMenuItem, JScrollPanel.AccessibleJScrollPane, JSlider.AccessibleJSlider, JSpinner.AccessibleJSpinner, JSpinner.DateEditor, JSpinner.DefaultEditor, JSpinner.ListEditor, JSpinner.NumberEditor, JTitledPanel.AccessibleJTitledPanel, JTitledPanel.ModelListener, JTitledPanel.JTable.AccessibleJTable, JTitledPanel.JTableHeader, JTextArea.AccessibleJTextArea, JTextComponent.AccessibleJTextComponent, JTextField.AccessibleJTextField, JTitledBorder.AccessibleJTitledBorder, JTitledBorder.JTree.AccessibleJTree, JTitledBorder.JTree.TreeModelHandler, JTitledPanel.TreeSelectionRedirector, JVViewport.ViewListener, KeyAdapter, List.AccessibleAWTList, MetalComboBoxEditor, MetalComboBoxUI.UIResource, MetalComboBoxUI.MetalPropertyChangeListener, MetalFileChooserUI.DirectoryComboBoxAction, MetalFileChooserUI.FilterComboBoxModel, MetalFileChooserUI.SingleClickListener, MetalLabelUI, MetalRootPanelUI, MetalSliderUI.MetalPropertyListener, MetalToolBarUI.MetalContainerListener, MetalToolBarUI.MetalDockingListener, MetalToolBarUI.MetalRolloverListener, MouseAdapter, MouseDragGestureRecognizer, MouseInputAdapter, MouseMotionAdapter, ProgressMonitor.AccessibleProgressMonitor, PropertyChangeListenerProxy, RelationService, StyledEditorKit.AlignmentAction, StyledEditorKit.BoldAction, StyledEditorKit.FontFamilyAction, StyledEditorKit.FontSizeAction, StyledEditorKit.ForegroundAction, StyledEditorKit.ItalicAction, StyledEditorKit.StyledTextAction, StyledEditorKit.UnderlineAction, SynthButtonUI, SynthCheckBoxMenuItemUI, SynthCheckBoxUI, SynthColorChooserUI, SynthComboBoxUI, SynthDesktopIconUI, SynthDesktopPaneUI, SynthInternalFrameUI, SynthLabelUI, SynthListUI, SynthMenuBarUI, SynthMenuItemUI, SynthMenuUI, SynthOptionPaneUI, SynthPanelUI, SynthPopupMenuUI, SynthProgressBarUI, SynthRadioButtonMenuItemUI, SynthRadioButtonUI, SynthRootPanelUI, SynthScrollBarUI, SynthScrollPaneUI, SynthSeparatorUI, SynthSliderUI, SynthSpinnerUI, SynthSplitPaneUI, SynthTabbedPaneUI, SynthTableHeaderUI, SynthTableUI, SynthToggleButtonUI, SynthToolBarUI, SynthToolTipUI, SynthTreeUI, SynthViewportUI, TextAction, TextArea.AccessibleAWTTextArea, TextComponent.AccessibleAWTTextComponent, TextField.AccessibleAWTTextField, ToolTipManager.ToolTipManager.insideTimerAction, ToolTipManager.outsideTimerAction, ToolTipManager.stillInsideTimerAction, UndoManager, VetoableChangeListenerProxy, WindowAdapter

public interface EventListener

A tagging interface that all event listener interfaces must extend.



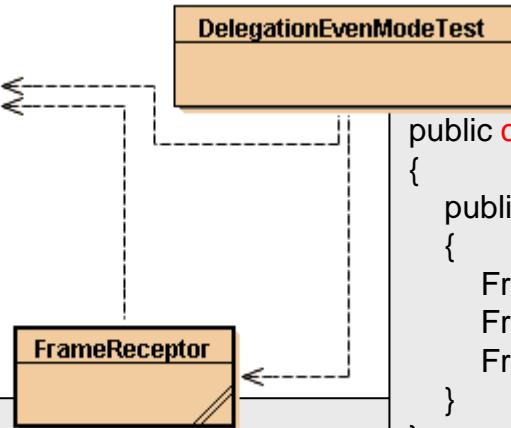
Este es un ejemplo de Interfaz "etiquetador"

Métodos de los principales Listeners

ActionListener	actionPerformed(ActionEvent)
ItemListener	itemStateChanged(ItemEvent)
MouseListener	mousePressed(MouseEvent) mouseReleased(MouseEvent) mouseEntered(MouseEvent) mouseExited(MouseEvent) mouseClicked(MouseEvent)
MouseMotionListener	mouseDragged(MouseEvent) mouseMoved(MouseEvent)
KeyListener	keyPressed(KeyEvent) keyReleased(KeyEvent) keyTyped(KeyEvent)
FocusListener	focusGained(FocusEvent) focusLost(FocusEvent)
AdjustmentListener	adjustmentValueChanged(AdjustmentEvent)
ComponentListener	componentMoved(ComponentEvent) componentHidden(ComponentEvent) componentResized(ComponentEvent) componentShown(ComponentEvent)
WindowListener	windowClosing(WindowEvent) windowOpened(WindowEvent) windowIconified(WindowEvent) windowDeiconified(WindowEvent) windowClosed(WindowEvent) windowActivated(WindowEvent) windowDeactivated(WindowEvent)
ContainerListener	componentAdded(ContainerEvent) componentRemoved(ContainerEvent)
TextListener	textValueChanged(TextEvent)

Un ejemplo hecho “a mano”

```
import java.awt.*;
public class FrameEmisor extends Frame {
    Button boton;
    public FrameEmisor() {
        boton = new Button ("Púlsame");
        add (boton);
        setVisible(true);
        pack();
    }
}
```



```
public class DelegationEventModeTest {
    public static void main(String[ ] args)
    {
        FrameEmisor fe=new FrameEmisor();
        FrameReceptor fr=new FrameReceptor(fe);
        FrameReceptor fr2=new FrameReceptor(fe);
    }
}
```

```
public class FrameReceptor extends java.awt.Frame implements MouseListener {
    private int toques=0;
    Label etiqueta
    public FrameReceptor(FrameEmisor f) {
        etiqueta = new Label ("El botón no se ha pulsado ni una sola vez");
        add (etiqueta);
        setVisible(true);
        pack();

        f.boton.addMouseListener(this); <--> Suscripción
    }
}
```

```
public void mouseClicked (java.awt.event.MouseEvent evt) {
    etiqueta.setText ("El botón se ha pulsado "+(++toques)+((toques==1)?" vez":" veces"));
}

public void mousePressed (MouseEvent evt) { }
public void mouseReleased (MouseEvent evt) { }
public void mouseEntered (MouseEvent evt) { }
public void mouseExited (MouseEvent evt) { }
```

MouseListener

